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THE VETERINARY JOURNAL

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Professor Thomas Dalling, M.R.C.V.S.
Director of the Institute of Animal Pathology, Cambridge.

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Veterinary Adviser to various Overseas Governments; late Chief Veterinary Officer to the Corporation of the City of London

FEBRUARY, 1937

Biography

PROFESSOR THOMAS DALLING, M.R.C.V.S.

IT is with pleasure that the whole profession will welcome the appointment of Major Thomas Dalling to the high distinction which accompanies the position in the world of science of Director of the Institute of Animal Pathology in the University of Cambridge. It is one of the highest honours which it is possible for a member of our profession to obtain, and in selecting Thomas Dalling for this position the Electors have shown excellent judgment, as there is no man in the profession who has done more valuable scientific work against animal diseases in the realm of preventive medicine. His work with Professor Gaiger on the protection of lambs against lamb dysentery has become classical, and has saved agriculture and the owners of sheep hundreds of thousands of pounds; whilst in the canine world his work on distemper in conjunction with Laidlaw and Dunkin has resulted in the production of a vaccine which can be transmitted all over the world. It was Dalling who, with Dr. Okel, demonstrated the leptospira as the cause of a form of jaundice in the dog, and it was their work which produced a prophylactic serum for the in-contact animals, and a remedy which gives a perfect immunity. In the prevention of certain poultry diseases, Dalling has done much, and at the present time he is working on the immunising power of certain remedies in some of the devastating epidemic troubles which are the cause of so much loss to poultry breeders.

As a student at the Royal (Dick) Veterinary College, which he entered in 1910,

his career was a very distinguished one, his class medals being too many to enumerate, and in 1914 (in which year he qualified with honours) he was awarded the first FitzWygram and Williams Memorial Prizes. During the Great War he undertook laboratory work, and was attached to various hospitals in France, being promoted Major and rewarded by mention in Sir Douglas Haig's despatches. On returning to civil life he commenced private practice, but in 1920 found more congenial work as assistant to the late Professor Gaiger; and on the formation of the Animal Diseases Research Association his patience and sterling qualities as a research worker caused him to be appointed as the Chief Investigator. It was during this time that he did much brilliant work in collaboration with his colleagues on the prophylaxis of certain sheep diseases, especially braxy and lamb dysentery. In 1923 he was appointed to the Wellcome Physiological Research Laboratories, where, in addition to routine in connection with the production of sera in horses for human and veterinary use, he instituted a Veterinary Research Department.

Amongst the awards which have been given to him by the profession are the Dalrymple Champneys Cup and Medal and the Victory Medal of the Central Veterinary Society. He is at the present moment a Vice-President of the Section of Comparative Medicine of the Royal Society of Medicine, Hon. Secretary of the S.E. Division of the National Veterinary Medical Association, and an original Founder and Past-President of the Veterinary Research Club, being, too, the first veterinary surgeon to be elected a member of the Medical Research Club.

Editorial

THE PREVALENCE OF CONGENITAL TUBERCULOSIS IN CALVES.

It is worth while to draw special attention to an article on "Some Aspects of Bovine Tuberculosis" by Mr. Harold Burrow in this month's issue; in which the author, in discussing the question of tuberculosis in young stock, draws especial attention to the presence of this disease in calves, and emphasises the fact of its presence in the fœtus *in utero*, supporting his statements by recording instances which have been met with in his own personal experience.

These are of especial interest because, although not new, it is a subject about which there have in the past been contradictory statements made, and this condition was at one time supposed to be extremely rare.

VETERINARY SURGEONS AS JUDGES AT CHAMPIONSHIP DOG SHOWS.

A considerable amount of feeling has recently been shown by correspondence which has taken place in the canine press at the decision of the Kennel Club authorities to forbid the election of veterinary surgeons as judges at championship

shows, and it is all the more non-understandable as members of the veterinary profession are permitted to act as judges in ordinary shows. Surely the two things are inconsistent, and it might even be considered as a matter of resentment on the part of the profession for its members to be treated in this way. The Kennel Club, and indeed the whole canine world, have no better friends than the members of the veterinary profession, who are not only the guardians of the health of their dog shows and exhibitions (in most cases without pecuniary reward), but the application of whose professional skill is so necessary for the well-being of all dogdom. It might even be inferred that this rule was instituted in order to prevent any chance of "leniency" on the part of a veterinary inspector towards an owner who happened to be his client; but such a breach of good faith, under such circumstances, would be inconceivable. The matter is, we believe, being taken up by the National Veterinary Medical Association, and we are sure that measures of good sense will prevail to such an extent that this matter will be readjusted to the equal satisfaction of the Kennel Club and the profession.

THE PROTECTION OF ANIMALS AGAINST GAS.

We are living in an age in which wars and rumours of wars are a daily occurrence, and to be unprepared whilst the horrors of the late great European conflagration are still vivid in the minds of the present generation, would be folly. This duty of protection extends not only to human populations, but also to the animal; for as time has gone on, the methods and weapons of warfare have become more and more terrible, and the ingenuity of man has on each occasion brought out something more devilish than has been used in the past; and this next war will not only be a war in the air, but a war whose instruments of destruction will be carried speedily and with terrible results by aerial transport. The citizens of every town are being awakened by lectures, demonstrations and other means to the precautions which must be taken against suffocating and destructive gases and other substances which will kill by inhalation methods; or disfigure horribly and kill by external contact; and although stereotyped regulations may be valuable when aided by human obedience, these will not be possible to follow to the same extent when dealing with animals. It will be wise to know how far these latter can be protected, and in another page we give diagrams, which are being issued in this and other countries, as realities, and not fantasies, for application at any rate to those which come in closest and most useful contact with man—the horses and the dogs. The difficulties will be in any attempt at universal application and in getting our patients to understand that once a mask is applied it must be kept in position. However, everything must have a beginning, and it is only by realising our difficulties that we shall be able to overcome them.

General Articles

SOME ASPECTS OF BOVINE TUBERCULOSIS.

By HAROLD BURROW, M.R.C.V.S., D.V.S.M.
Chief Veterinary Officer, Derbyshire.

In view of the widespread importance of bovine tuberculosis and the discussions which at this time are centred around the possibility of its control and, it is hoped, final eradication, the accompanying notes on certain aspects of the disease will, it is hoped, make interesting and informative reading.

Tuberculosis in Young Stock.

(*a*) *Congenital Tuberculosis in Calves: Post-mortem Findings.*—The conflict of opinion as to whether true congenital tuberculosis ever exists in calves has now been settled in the affirmative, and the following three cases confirm beyond any doubt the actual occurrence of such cases. In the first case, a pedigree shorthorn cow, served on March 5th, 1931, was slaughtered under the Tuberculosis Order on November 5th, 1931. On post-mortem examination the cow was found to be affected with acute tuberculous pleurisy and peritonitis, in addition to which all the internal organs were affected with tuberculosis in varying degrees. The uterus, on being opened, was found to be affected with tuberculous endometritis, in spite of which a well-developed female fœtus was present, showing on external examination every sign of normal development and nourishment. On opening the fœtus it was found that the substance of the right lung, the bronchial glands, the substance of the liver, spleen and kidneys, the hepatic gland, the right prepectoral and presternal glands, both external iliac and one lumbar gland, showed well-defined lesions of tuberculosis.

In the second case, a cow was slaughtered on March 7th, 1932, three days after calving, and on post-mortem examination was found to be affected with miliary tuberculosis of both lungs, tuberculosis of pleura, peritoneum, substance of liver and kidneys and of the mediastinal and mesenteric glands. The endometrium did *not* show visible evidence of tuberculosis. The three-days-old calf (male) was in a weakly condition and was slaughtered (by consent of the owner) for purposes of interest. Post-mortem examination of the calf showed tuberculosis of the substance of liver, spleen and kidneys, and of the bronchial, mediastinal and hepatic glands. It is quite beyond possibility of dispute that well-defined lesions found in the organs of a three-days-old calf had been initiated and had developed during its intra-uterine life.

In the third case, a cow was slaughtered under the Tuberculosis Order on July 11th, 1934, and on post-mortem examination showed tuberculosis of the lungs, bronchial and mediastinal glands, pleura and peritoneum, and mesenteric

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glands. The gravid uterus, on being opened, showed tuberculous lesions in the endometrium and contained a bull calf of approximately six months' development. This fœtus, on being opened, showed tuberculous lesions in the substance of the liver and spleen and in the mediastinal and hepatic glands. The kidneys were free from macroscopic lesions of tuberculosis.

These three cases confirm the now established conception of true congenital tuberculosis as occurring in calves.

Careful post-mortem examinations carried out during the course of routine meat inspection in the abattoir then under the writer's control give a fair indication of the percentage of congenital tuberculosis occurring in calves in the dairying districts of this country. During the period from January 1st, 1932, to September 30th, 1935, 4,535 calves varying in age from approximately two to ten weeks were slaughtered in that abattoir. These calves were drawn from dairy farms in Cheshire, Shropshire, Lancashire and the northern counties of Wales. Of the 4,535 calves slaughtered, 76 (1.67 per cent.) were found to be affected with tuberculosis. In an effort to differentiate the cases of congenital tuberculosis from those of post-natal origin it was decided to class as congenital only those cases in which any *two* of the three organs—liver, spleen and kidneys—showed tuberculous lesions, all other cases being classed as of post-natal origin. The writer does not feel that the presence of caseous lesions in a three-weeks-old calf necessarily implies congenital origin, as the time taken by the disease in arriving at the stage of caseation in young animals has not definitely been ascertained, and one feels that " mature " lesions may develop in a much shorter space of time than is generally supposed. On this basis, twenty-four of the seventy-six cases were classed as congenital in origin, giving a percentage of 0.53 of the total number of calves examined (4,535).

(*b*) *Reactors to the Double Intradermal Test.*—During the summer and autumn of 1936 the writer has tested for the first time a number of dairy herds in Derbyshire, and particulars of the results of the tests of seventeen of these herds are specially interesting as showing the number of reactors found among calves under the age of one year. These seventeen herds comprised 1,171 animals, among which were 210 calves; and of these calves 19 (9 per cent.) reacted to the double intradermal tuberculin test. The 19 reacting calves are classified in the following table :

Age.	Number of reactors.
Under 1 month	1
1–2 months	3
2–3 ,,	–
3–4 ,,	2
4–5 ,,	–
5–6 ,,	–
6–7 ,,	5
7–8 ,,	1
8–9 ,,	2
9–10 ,,	1
10–11 ,,	3
11–12 ,,	1
Total under one year	19

It will be seen from this table that practically one-third of the reacting calves were under six months of age. One might mention here that the youngest reactor was exactly two weeks old.

Of the 1,174 cattle of all ages on these seventeen farms, 447 (38 per cent.) reacted; the 19 reacting calves under one year of age accounted therefore for 4.2 per cent. of the total number of reactors found. The figures, although limited in extent, serve to emphasise the importance of tuberculosis in calves and the need for including even *young* calves in the general tuberculin testing of a herd. The writer is of the opinion that no calf is too young to be submitted to the tuberculin test, and the finding of four reactors (out of a total of 19) under eight weeks old, of which one was only fourteen days old, indicates the need for including even newly-dropped calves in the general herd test.

It is interesting to analyse the tests of these seventeen herds in order to see if any relationship occurs between the percentage of reactors found in the adult cattle and the calves respectively. The table on p. 47 gives this analysis.

It will be noticed from this table that in each herd (with the exception of No. 4) where reacting calves bred on the farm were found, the percentage of reactors among the adult cattle was high (between 80 per cent. and 90 per cent.). In the case of Herd 10 the reacting calf was a purchased one not bred in the herd, and was probably infected before purchase. In the case of Herd 4 the percentage of reacting calves is higher than the average when compared with the percentage of reacting cows.

The accompanying snapshot shows three pedigree British Friesian calves all between 11 and 12 months old. The small calf, a reactor to the tuberculin test and showing clinical symptoms of tuberculous meningitis, was slaughtered on the day following the taking of these snapshots. Post-mortem examination showed that this was a case of definite congenital tuberculosis. Lesions were present in both lungs, in the substance of liver, spleen and kidneys, on the pleura and peritoneum, and in the bronchial, mediastinal, mesenteric, hepatic and renal glands. The brain was removed from the skull, and numerous typical tuberculous nodules were found studding the meninges of the cerebellum. The snapshot shows the markedly stunted growth of the calf as compared with its companions of the same age, and the carrying of the head on one side due to the effects of tuberculous nodules in the covering of the cerebellum.

Tuberculosis of the Uterus.

As a source of infection of calves, the cow affected with a tuberculous endometritis cannot be ignored. Fortunately, the fact that the extension of lesions of tuberculosis in the endometrium automatically renders the cow sterile does much to negative this danger, but the writer has met with several cases, similar to the first and third cases quoted in this article, where tuberculosis of the uterus and pregnancy co-existed.

In these cases it is probable that infection has been carried to the uterus

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PERCENTAGE OF REACTORS FOUND IN ADULT CATTLE AND CALVES.

	Cows. (over 3 years)			Heifers (1–3 years)			Bulls (all ages)			Calves (under 1 year)		
Herd No.	No. tested	No. of reactors	Percentage reactors	No. tested	No. of reactors	Percentage reactors	No. tested	No. of reactors	Percentage reactors	No. tested	No. of reactors	Percentage reactors
1	13	5	39	3	—	—	1	1	100	6	—	—
2	28	25	90	16	13	81	1	1	100	14	1	7
3	40	33	82.5	28	18	64.3	—	—	—	10	5	50
4	65	24	37	47	8	17	2	—	—	44	5	11
5	37	32	86.5	38	9	24	2	2	100	3	1	33
6	39	21	54	41	14	34	1	—	—	20	—	—
7	64	11	17.2	23	—	—	1	—	—	22	—	—
8	44	19	43	16	4	25	6	3	50	26	—	—
9	25	16	64	6	3	50	1	1	100	1	—	—
10	18	1	6	7	—	—	1	—	—	13	1*	8
11	18	8	44	24	2	8	1	—	—	3	—	—
12	24	19	79	33	17	51.5	1	1	100	9	—	—
13	79	28	35.4	41	10	24.4	3	1	33	12	—	—
14	12	9	75	9	1	11	1	1	100	1	—	—
15	11	9	82	3	1	33	—	—	—	4	1	25
16	28	24	86	10	—	—	2	1	50	10	5	50
17	38	26	68	9	4	44.5	3	2	66	12	—	—
17	583	310	53	354	104	29	27	14	52	210	19	9

Total animals tested = 1,174. Total reactors = 447 (38 per cent.). * This was the only calf of the 210 calves tested which was not bred on the farm.

subsequent to conception, as it appears that even a light infection of the uterine mucosa is sufficient to make conception impossible. One bases this opinion on the fact that in the majority of cases where even slight tuberculous endometritis is found at post-mortem, a history of persistent sterility accompanies the case.

The writer has made careful post-mortem examinations (macroscopic) of the uterus in eighty-two consecutive cases of cows slaughtered under the Tuberculosis Order, and found that nineteen of these cows, *i.e.* 23.75 per cent., showed definite naked-eye lesions of tuberculosis in the mucosa and/or submucosa of the uterus. In only two of these particular cases was the animal pregnant.

The results of this limited investigation show a percentage of uterine tuberculosis probably higher than would be found by an investigation of greater scope, but they serve to focus attention on the not inconsiderable importance of this aspect of the disease. Furthermore, although invasion of the endometrium soon leads to permanent sterility as regards future attempts at conception, it would seem that such invasion when occurring *during pregnancy* can and does lead to the birth of a congenitally infected calf from that pregnancy. The fact that one has found congenital tuberculosis in 0.53 per cent. of calves slaughtered in the abattoir lends support to this belief.

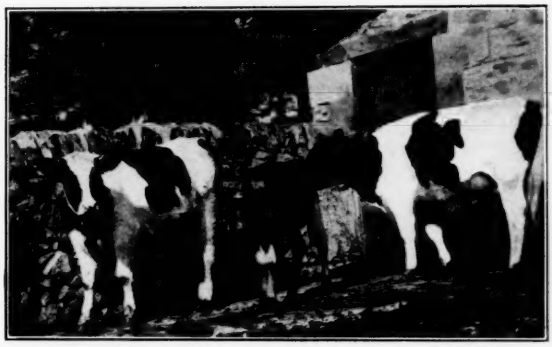
POULTRY INSPECTION

By Lt.-Col. DUNLOP YOUNG, O.B.E., D.V.S.M., M.R.C.V.S.
Charterhouse Chambers, Smithfield, London, E.C.

POULTRY inspection as to fitness for human food does not receive the attention it should do, more especially when it is known that avian diseases cause losses up to 50 per cent. of the stock in some places, and large numbers of birds which are showing signs of doing badly are disposed of in the dead meat markets.

Some years ago, with the assistance of the staff of meat inspectors in Smithfield, I made a careful post-mortem examination of poultry which had been taken as unfit for food; the causes for unfitness were many, but tuberculosis accounted for at least 50 per cent. I would have liked to have made a 100 per cent. examination of all fowls deposited for sale in the City of London, but found it a task beyond execution with the staff at my command. One of the greatest difficulties being that large quantities of fowls were imported carefully packed in boxes; these would have to be unpacked and repacked, thus destroying the neat packing and interfering with the trade, as thousands of boxes are sold, unopened, per sample.

In my opinion the time has come, and is indeed long overdue, when all imported poultry should be certified as having been examined and found free from disease by Government veterinary inspection in a similar manner to articles of food classed under the Public Health (Imported Foods) Regulations. It has been stated by inspectors that it would be necessary to " draw " the fowls, *i.e.*, withdraw the abdominal contents; this is not necessary, because a well-



Three Friesian calves, each 11–12 months old; the stunted growth of the centre one due to tuberculosis.

(*Article by* Mr. Harold Burrow, M.R.C.V.S., D.V.S.M., *page* 44)

German pattern of anti-gas mask for horses.

("Anti-Gas Masks for Horses and Dogs," *page* 50)

trained inspector can examine the abdominal contents of a fowl without drawing them, or spoiling the marketable appearance of the carcase. Tuberculous lesions, associated with emaciation, the most common cause for seizure, are generally easily observed in the liver, spleen, and intestinal walls; the lungs are, in my experience, not commonly affected.

I remember a firm who supplied fowls to a preserved goods manufacturer requesting our staff to make a post-mortem examination, and grant a certificate as to fitness for food. So many were found unfit that the examination was, by request of the firm, stopped. If examination of poultry was instituted and the percentage of tuberculosis found to be great, it would probably result in some action being taken to eradicate the disease in poultry farms and also farms where poultry, pigs and cattle are all produced. This in turn would assist in elimination of tuberculosis from pigs and cattle, as it has been found by Dr. Griffiths, working on lesions supplied by the writer from pig carcases in Smithfield, that 33 per cent. of the disease was due to infection by bacilli of the avian type.

When in the United States of America, prior to leaving Smithfield, I discussed with the Federal Officers the post-mortem inspection of poultry intended for exportation, and found that they had been carrying out tests on this subject, also that they anticipated regulations would ere long be framed by the British Government requiring post-mortem certificates.

A city ordinance recently enacted in Chicago prohibits the sale of canned poultry products within the city unless they have been inspected and passed as fit for consumption as human food by the U.S.A. Department of Agriculture. Inspection of dressed poultry is done by the Bureau of Agricultural Economics, and the services are utilised by most of the larger canners of poultry products. The inspection consists in examination by a qualified veterinarian of each poultry carcase at the time it is eviscerated, to determine that it is healthy and otherwise fit for human food; all diseased or unfit poultry is denatured. This poultry inspection service meets the requirements of the Chicago ordinance. It is available to all poultry canners who are willing to pay the costs of the service and to make suitable arrangements for examinations.

Abels, after carrying out experiments with B.C.G. on fowls, came to the conclusion that avian B.C.G. does not protect poultry against tuberculosis, but he ascertained that pullets as well as chickens are refractory towards an artificial peroral and parenteral infection with tuberculosis germs to a considerable degree, that the infrequent and late development of tuberculosis lesions in chickens after exposure to infection, and the slow progress of the lesions towards the carrier stage in which bacteria can be found in the excreta, explains the fact that where flocks are renewed at least every two years, tuberculosis as a rule is unable to gain a foothold.

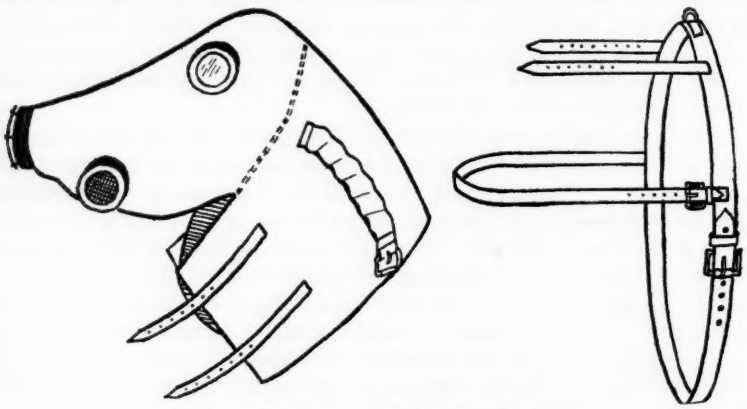
A condition which has for some time caused considerable trouble in the United States of America is known as "fowl leukosis." It has been classed by Lee, Wilcke, Murray and Henderson into three types: erythroid, myeloid and lymphoid, and may be further differentiated as nerve, eye and viscera types, or lympho-

cytoma, according to the site of the lesions, but all these may merge into one another. Important factors to note are: (1) Young birds are most susceptible; (2) cause is a filterable virus which can be transmitted by injection of infected tissue and contact with infected birds or infected premises; (3) the disease is one of the most important affecting the poultry industry; (4) the best methods of control are proper sanitation and breeding stock from resistance sources.

ANTI-GAS MASKS FOR HORSES AND DOGS.

THE illustrations show patterns of gas masks which have been adopted by several of the Continental countries as practicable for application in gas warfare to horses and dogs. Their cost is somewhat prohibitive in England at present if made to specification, but it is hoped that this may be reduced.

The horse mask respirator portion is shaped like a nosebag and covers the upper jaw and nostrils—being thickly padded to prevent leakage—and there is a



Continental patterns of Canine Anti-Gas Masks.

container of charcoal to act as a filter pad at the bottom. Air is drawn through this filter and enters by holes at the bottom of the respirator. It is claimed that it does not interfere with the bit at all, so that it can be applied to the horse whilst being ridden.

The dog mask needs to be fitted to each animal, the outer cover being stockingette and the inner lining of fleecy wool. The two side attachments are containers of activated charcoal, and detachable. The eyepieces are of "undimmable" material, and two straps fix the mask tightly to the neck in such a way that the dog still has free movement. A soft rubber pad in the form of a ring is fitted over the jaws to prevent the dog biting his way out.

[Each, however, will need much improvement before becoming possible for practical use.—ED.]

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THE PRESENCE OF COPPER IN LAMBS' LIVERS.

By Lt.-Col. DUNLOP YOUNG, O.B.E., D.V.S.M., M.R.C.V.S.

Charterhouse Chambers, Smithfield, London, E.C.

FOR some considerable time I have, on behalf of one of the Governments which I have the honour to represent, been interested in the amount of copper found in imported lambs' livers.

As will be seen by the analyst's report, the question arose anent an analysis made by a city analyst expressing the opinion that the amount of copper found was abnormal and probably arose from contamination. Consulting literature on the subject it appears that copper is present in the livers of many animals; it was, therefore, resolved by the Government concerned, in conjunction with its producers' board, that a thorough investigation should be made as to whether the copper existing in the lambs' livers was derived from one or all of the areas of the country concerned. This was done; I then suggested to the analyst that it might be advisable while doing the work to test English, Scottish and Welsh livers for comparative purposes, and this was done. The following report will therefore no doubt be of considerable scientific value to breeders, feeders, public health authorities, and especially to veterinary meat inspectors.

"I have examined for copper thirty-seven samples of lambs' livers, including thirty samples of imported origin and seven samples of United Kingdom origin. The method employed was a slight modification of that described by Sylvester and Lampitt (*Analyst*, June, 1935, p. 376) and may be briefly outlined as follows:

"Twenty-five grams of liver was ashed in porcelain. The ash was dissolved in hydrochloric acid and the solution filtered. The filtrate was extracted with a 0.25 per cent. choloroform solution of diphenyl-carbazone. The chloroform solution of the copper compound was separated and the chloroform removed by evaporation. The residue was dissolved in concentrated sulphuric acid and the solution was boiled and filtered. The solution was made alkaline with ammonia and treated with a 0.1 per cent. aqueous solution of sodium di-ethyl-di-thio-carbamate. The copper was estimated colorimetrically by comparison with a standard solution of copper.

"In a number of cases the amount of copper present in 25 gm. of liver (*i.e.*, less than one ounce) was so considerable that the acid solution of the ash when made up to 100 c.c. (about three ounces) showed quite a strong blue colour.

"The results are tabulated below, the copper being expressed as parts of metallic copper (Cu) per million parts of dried liver. Naturally this entailed the estimation of moisture in each sample. Some livers were received frozen and

some thawed out, so the moisture was estimated after the liver had thawed and drained. The moisture constituted about two-thirds of the weight of the thawed and drained sample.

Imported lambs' livers. Identifying numbers of the meat works.	Number of livers tested.	Copper in parts (million) on dry matter.	
1	2	33.6	49.8
2	2	21.6	31.2
3	2	49.8	16.8
4	4	{ 36.0 { 72.0	348.0 144.0
5	2	36.0	36.0
6	2	240.0	195.0
7	2	195.0	168.0
8	2	36.0	510.0
9	2	144.0	48.0
10	2	96.0	144.0
11	2	144.0	120.0
12	2	360.0	240.0
13	2	120.0	72.0
14	2	72.0	144.0
Scotch	3	120.0	{ 72.0 { 286.0
English (Devon)	2	138.0	96.0
Welsh	2	84.0	120.0

"This investigation arose through a report by a city analyst of certain livers packed by a meat company on the grounds that they contained 250 and 350 parts of copper per million parts of dried liver, these quantities being "abnormal and excessive." The city analyst also stated that he had analysed English livers and found copper therein to the extent of 25 parts per million of dry matter. Dunn published in 1932 a value of 9 parts per million dry matter.

"The most exhaustive and authoritative paper so far published on this subject is by Cunningham (*Biochem. Journ.*, vol. 25, p. 1267, 1931). In this paper Cunningham developed a theory, which has since been widely accepted, that the presence of copper in foodstuffs is necessary as a catalyst to facilitate the absorption of iron in the synthesis of hæmoglobin. He estimated copper in various organs of marine creatures and land animals and found that almost invariably the liver was the site of the largest proportion of copper. He gave the average content of copper in sheep liver in parts per million dry matter as 323, with a range of 212.5 to 497.5. This work was done in this country, so it is fairly safe to assume that the livers were of home origin.

"My values for imported livers, estimated by the latest and I believe the most accurate method, give an average of 141 with a range from 21.6 to 510.0. It is to be noted that my maximum agrees very closely with that of Cunningham, *e.g.*, 510 and 497.5, whereas I have obtained a number of surprisingly low values, much below any found in sheeps' or lambs' livers by Cunningham, but of the same

order as those found by the city analyst. I am bound to accept the statement made by Colonel Young that it is quite impossible for this copper to have found its way into the imported livers by any form of accidental or deliberate contamination. The fact that there is no common method of dosing *all* the sheep in the country concerned, internally or externally, with copper salts as a parasiticide and that other observers have found similar proportions of copper in genuine livers, constitute, in my opinion, ample confirmation of these statements.

"It is clear that it has long been established that copper is contained in the livers of mammals, but the difficulty is to decide upon the proportion which may fairly be considered normal. Having regard to the date given above, I am of the opinion that copper can be present in normal imported lambs' livers to the extent of at least 500 parts per million of dry matter.

"As regards the copper content of liver derived from United Kingdom lambs, my work has not been so exhaustive, but the average of seven samples, including three Scotch, two Welsh and two Devon, gives a value of 132 parts per million dry matter—remarkably near my average of 141 for the imported livers.

The presence of copper in liver is intimately associated with the presence of iron therein and the synthesis of hæmoglobin, but there seems to be no evidence in the literature of any definite knowledge of the form in which the copper is found, *i.e.*, whether it is ionic copper or copper in organic combination. Iron is undoubtedly present in foodstuffs in both forms, and we have definite experimental knowledge that the ease of assimilation of iron compounds depends entirely on the form of combination of the iron. Iron is most readily assimilated in the form of ferrous salts, whereas iron in the complex organic form of hæmin derivatives—hæmoglobin, cytochrome, etc.—is not assimilated by the body. It is, therefore, possible that the copper in liver is not in a form which can be assimilated by the body, but no work would appear to have been published upon this point. If it should be that the copper in liver is not in an assimilable form, any question with regard to amounts of the order of 25 to 500 parts being "excessive and abnormal" cannot arise.

"The catalysis of hæmoglobin building by traces of copper in experimental animals would appear to have received some application in the field of human medicine with relation to anæmia, for one finds the following prescription in the "National Formulary for National Health Insurance Purposes," issued by the British Medical Association: Ferri. sulph., gr. 3; mag. sulph., gr. 30; acid sulph. dil., m. 5; cupri sulph., gr. 1/20; aq. menth. pip. ad. fl. oz. ½.

"In this prescription the presence of copper in conjunction with iron should be noted. A very interesting paper on this subject, together with many references to the literature, will be found in a recent issue of *The Lancet*, January 4th, 1936."

"Since determining the above investigation I have, by the courtesy of a medical friend, been able to estimate copper in the livers of ten human cadavers by the same method. The results were :

Liver.	Copper in parts (million) on dry matter.
1	126.0
2	22.0
3	5.2
4	19.0
5	36.0
6	20.9
7	33.6
8	19.0
9	29.2
10	20.8

"All of these livers were healthy except Sample 3, which was one of the severest cases of hæmatochromatosis ever reported, the liver being almost solid oxide of iron. This is very significant in view of the extremely small content of copper.

"I have also determined the copper in two samples of widely-used liver extract, both of proprietary brand. The copper was 0.1 and 5.4 parts (million) on the dry matter, so that apparently the process of manufacture does not result in all the copper content of the liver being retained in the extract, and stimulates me to think that it might be possible to improve the process of manufacture of liver extracts.

"This subject of copper in livers is by no means a new one, and there is in fact a very extensive literature. Much of the early bibliography was collected by Mr. B. C. Aston, of the Department of Agriculture, Wellington, New Zealand, and he has been good enough to send me a reprint of his paper of 1912 on the 'Chemistry of Bush Sickness' (*Trans. N.Z. Inst.*, xliv) in which this is incorporated. As this journal is not available in this country, I think it would be valuable to summarise the literature here.

"Wynter Blyth ('Poisons,' 1895, p. 613) states that a sheep's liver contains one part of copper in 20,000, and quotes Dupré's remarks that in the kidneys and livers of ruminants copper may always be found. Lehman (*Arch. f. Hygiene*) gives 0.0048 as the percentage of copper in dried ox-liver. Ellenberger and Hofmeister (*Beid. Centr.*, 1883, p. 606) showed that liver retained copper with great tenacity. Dupré (*Analyst*, ii, 1, 1889), states that copper is found in all vegetables as well as in all animals, but rarely amounts to more than 0.001 per cent. The most authoritative paper is by Cunningham (*Biochem. Journ.*, vol. 25, p. 1267, 1931), from which the following figures may be quoted, again in parts per million on dry matter. Leek, lettuce,

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cabbage, carrot, beetroot, potato, turnip, garden pea, showed values of from 3 to 26.

Insects and Marine Creatures.	
Cockroach	32.4
House fly	77.6
Honey bee—	
Worker	25.0
Queen bee grub	24.5
Royal jelly	17.8
Octopus—	
Skin	108.3
Muscle	10.9
Ink sac	914.0
Ink	*nil*
Lobster—	
Liver	25.1
Eggs	93.2
Gonad	21.0
Herring—	
Liver	14.2
Skin	2.3
Flesh	2.3
Female reproductive organs	2.1
Male reproductive organs ...	2.3
Oyster	60.0
Whale	... minute traces

Cunningham also gives the following values for livers :

Human	24.9
Bovine adult	77.0
Bovine calf	470.0
Bovine fœtus	262.8
Sheep	236.6
Horse	14.8
Pig (adult)	41.3
Pig (few days old)	232.8
Dog	98.2
Cat	25.3
Guinea-pig	17.0
Rabbit	9.2
Rat	10.0
Badger	21.7
Domestic fowl	12.4

" Cunningham also remarks that a notable feature is the high proportion of copper in sheep's liver. His average content of 9 livers was 323 parts (million) dry matter, the range being 212.5 to 497.5.

" A. SCIVER, B.Sc., F.I.C.
(Messrs. Rideal, Rideal & Sciver) ".

Clinical Articles

Cystitis in a Gelding.

By A. J. BAXTER, M.R.C.V.S., D.V.S.M.
Lechlade.

THE subject was a shire gelding about sixteen years old. It was reported that he had been dribbling urine for about twelve months, but at the time I was asked to see him this had become worse and he had lost condition.

When seen on September 28th, 1936, his pulse, temperature and respiration were normal; urine dribbling, but looked normal. No further examination was made as a catheter was not to hand. A course of mixed diuretic powders was prescribed to see if by chance the condition might clear up. On October 9th the horse was seen again and his condition found to be decidedly worse. He was restless, and evidently in pain. The urine was bloody and dribbling frequently. Temperature was normal, pulse and breathing were quickened. The conjunctiva was injected. He was still feeding quite well. Examined per rectum the bladder was found to be full and tense. It was explained to the owner that a calculus was probably causing the trouble and an operation was suggested, but he would not consent.

Later an operation was decided on, but after further examination it was not carried out. The bladder was found to be distended and very tense. On passing the catheter no obstruction was met with in the urethra, and although it entered the bladder nothing returned through it. It was thought that the bladder might be full of sabulous matter, though examination of the end of the catheter revealed nothing. The owner was advised to have him destroyed, but he died the next day.

The post-mortem examination revealed an intense cystitis with thickening of the bladder wall and the bladder was full of blood clot. All other organs appeared to be normal. The case is of interest owing to the long time it had existed, the failure of the catheter to return anything diagnostic, and the absence of any cause likely to have originated the cystitis.

Acquired Malformation of the Lower Jaw in a Horse.

By DR. EDWARD POSTL-GRAZ.

IN May a two-year-old iron-grey stallion was brought into the Graz hospital with a peculiar malformation of the lower jaw, which prevented the mouth being closed on the right side. According to the owner this had occurred through the mare treading on the lower jaw when the subject was a foal.

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Acquired malformation of the lower jaw in a horse.

(*Article by* Dr. Edward Postl-Graz, *page* 56)

On examination at the time, the right portion of the incisive part together with three incisor teeth of the lower jaw were pushed out and thickened. This outward pressed portion of the jaw pressed the under lip down and the mucous membrane surrounding the three incisor teeth was ulcerated to the bone. The thickened and protruded portion of the jaw appeared plainly demarked from the remaining portion of the lower jaw.

Since the horse was hindered in grasping food on account of this abnormality, and spread an objectionable smell through the stable through the ulceration, besides being unæsthetic in appearance, the owner desired operative removal of the protruded under-portion of the jaw. After casting and anæsthetising the under-jaw with novocain through the mental foramen, the mucous membrane behind the incisor teeth was dissected in a lap-formed shape, the periosteum pressed back, and the lower jaw-bone, together with the three incisor teeth, was cut off with a wire saw and the laps of mucous membrane sutured over the bone wound to the mucous membrane of the anterior side. The sutures were certainly pushed out in mastication, but the wound healed perfectly by granulation after a lapse of three weeks. Externally, after the operation, no defect could be noticed and the mouth could now be closed. Appetite and mastication suffered no loss through the operation.—*Wiener Tierarzt Monatsschrift.*

Observations on Some Cases of Congenital Malformation.

By A. C. SHUTTLEWORTH, B.V.Sc., F.R.C.V.S.
Department of Veterinary Anatomy, University of Liverpool.

Case 1.—A young mongrel puppy of six weeks old was examined because of a crippled front leg; supposed to have suffered an accident in the litter. The right limb was held in the position usually seen in congenital dislocation of the elbow. The forearm was rotated outwardly and the paw in extreme pronation, with the pads facing outwards and upwards.

An examination of the elbow showed great anatomical distortion, the outstanding points being the prominence of the olecranon on the external aspect of the elbow, the tense and contracted band of the caput muscles running upwards from this point, and the almost complete lack of movement in the joint. Slight flexion and extension were the only movements allowed. The contraction and atrophy of the flexors and extensors of the joint limited the movement even within the restricted range of the joint. The left forelimb was also disused. Although no dislocation was present here the elbow was excessively enlarged, movement being restricted both in flexion and extension. The olecranon was bowed forward, and there was a great thickening at the junction of the body of the ulna and the process. The puppy was destroyed.

Post-mortem.—Right Limb.—The deformity was a primary congenital dislocation of the elbow, the involved bones showing abnormalities of their articular surfaces

to accommodate themselves to their irregular relationships. The external articular prominence of the humerus was greatly enlarged and the internal correspondingly reduced in size. The radial and ulnar articular surfaces were only related to the large outer condylar surface, and to a certain extent encroached upon the outer non-articular surface of the external condyle, the synovial capsule being drawn across this area. The olecranon process was compressed laterally, was small and curved forward to surmount the outer condyle. This process did not occupy the olecranon fossa, which was abnormally shallow.

Left limb.—This elbow showed an interesting and rather puzzling condition of fracture of the olecranon with an extremely long fibrous union between the fragments. This fibrous union was three-quarters of an inch in length. The contraction of the extensor muscles of the elbow had drawn the olecranon process far out of its fossa, and thus strictly limited flexion, while disuse had brought about contraction of the flexors and so prevented extension. The remainder of the articular surfaces were normal. The right elbow, with its dislocation, was, I think, undoubtedly congenital, this being one of the most common of the congenital deformities in the dog. The fracture in the left elbow showed no signs of recent inflammation, but may have occurred at birth.

Case 2.—A four-weeks-old mongrel puppy. The right forelimb terminated in a pointed stump below the elbow. Movement during progression was very free in the shoulder and elbow. There was callus formation at the tip of the stump, simulating pad-tissue. On palpation the shoulder and elbow region were perfectly formed, but below the elbow there was no normality at all.

Post-mortem.—Dissection showed the elbow and shoulder quite normal. Below the radius and ulna faded into a spike-like formation, between the top of which and the skin was formed a small synovial bursa. This was apparently a case of ectromelus, arrested development of the limb, and was probably secondary, a normal fœtus being interfered with by some abnormal condition of the uterus, such as strangulation of the limb by an amniotic band, or some other adhesion bringing about the intrauterine amputation.

Case 3.—A three-months-old Scottish terrier puppy. Died immediately on arrival.

Post-mortem.—Two loops of intestine, black and necrotic, formed a strangulated hernia, the hernial ring being formed by a " window " through the great mesentery. The whole of the abdominal contents formed a most interesting study. The great mesentery showed numerous breaches of continuity between the branches and loops of the intestinal vessels, with smooth and regular edges, and with no sign of recent rupture or tear. These gaps or " windows " in the membrane varied in size from that of a threepenny-piece to that of a crown, and varied in shape from large circular openings to small oval or slit-like gaps between the smaller loops of the vessels as they approached the intestines. The shape and size of the openings were governed apparently by the area enclosed by an arterial loop. Occasional loops bounded sheets of quite normal mesentery.

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It is surprising that these gaps had not received and strangulated a loop of intestine before this did in fact occur. Other parts of the abdominal cavity showed gross malformation. The liver was attached firmly and widely to the abdominal surface of the diaphragm, to the first four inches of the duodenum, and to the pancreas. The pancreas was adherent to the gall-bladder. The spleen was firmly attached by its outer surface to the abdominal wall. The gastro-splenic ligament was very tense, and behind it lay the small stomach, curled up in the left epigastric region. The great omentum was absent. What this gross and widespread disturbance of the abdominal contents was due to I cannot imagine.

Streptococcal Infection in Pigs.

By Lt.-Col. DUNLOP YOUNG, O.B.E., D.V.S.M., M.R.C.V.S.
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LESIONS in pig carcases, of which the cause appears obscure, are often observed. The research work lately carried out by Lesbouyries and Berthelon will therefore be interesting and educative to veterinary surgeons, more especially to those engaged in meat inspection. According to these workers, tuberculosis excepted, streptococcal infection due to *Streptococcus suis.* is one of the chief causes of the lesions observed. Pigs of all ages are susceptible, and the disease may be sporadic or contagious, generally enzootic, and according to Glaser there are different varieties of infection, *e.g.*, septicæmia of sucking pigs, also of adult pigs, pneumonia, to which may be added streptococcal infection of sows, causing abortion, mammitis and exudative pericarditis of young pigs.

The disease may be observed in three forms—acute, subacute, and chronic. Septicæmic conditions are most often observed in young pigs and pregnant gilts; the young pigs die in five to twenty hours and the young sows in twenty-four to forty-eight hours after littering.

The subacute conditions show general symptoms: weakness, fever, congestion of the mucous membranes, followed by local affections of the joints, lungs, heart, intestines, skin, nerves and eyes, endometritis, abortion and mammitis. Any one or more than one condition may be observed in the affected animal.

Recovery is rare, even if it appears to occur; the infection may only be latent and become active again following gestation.

The chronic form generally follows the subacute, and the evolution is variable; generally there is arthritis and pulmonary disturbance, causing weakness and unthriftiness; the mammary gland may be infected, and there may be endometritis. Prognosis is always grave; mortality is high, being 50, 70 and 100 per cent. There seems no doubt that those which recover remain germ carriers, especially the sows, and these may succumb at next gestation.

Treatment.—Treatment is useless in the acute stage, as the animals die rapidly; it is difficult and often useless in the sub-acute and chronic forms; serotherapy, up to the present, has only given unsatisfactory results.

Prophylaxis.—Prophylaxis is based on good hygiene, elimination of germ carriers. Immunisation of young pigs can be tried by different methods: (1) anti-streptococcic serum (Westring); (2) vaccination in the course of gestation (Suberger); or (3) vaccination of the young pigs second or third day after birth (Wilems).

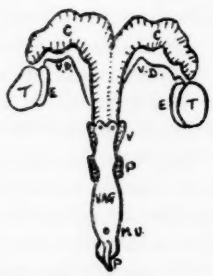
Lesbouyries and Berthelon have used, with success, an auto-vaccine prepared with cultures in bouillon serum of twenty-four hours from recently isolated streptotocci cultures heated for half an hour at 58 to 60° C. Vaccination of young pigs born from sows the young of which usually died from streptococcal infection protected them and conferred permanent immunity. The streptococci appear to be transmitted per the excreta, urine and pus, and gain access to the organism by different routes, such as the placenta, digestive (especially the first few days after birth), the mammary gland and teat canal.

Intersexual Development in a Goat.

By MARY L. SOMERVAIL, M.R.C.V.S.
Worthing.

Subject.—A British Toggenberg goat, aged six months, and reputed to be a female.

History.—The goat was bought, at the age of three months, as a female, and at that time showned no outstanding peculiarities. In the course of the next three months the owner noticed male characteristics developing, *e.g.*, the animal became fierce, the urine was noticeably strong smelling, the method of urinating was not that of the female, and the goat was continually endeavouring to mate the other members of the herd. By the time the animal had reached six months of age its whole appearance had altered, and from its behaviour and outward characteristics there could be no doubt that the animal was a male. From some source the owner received the information that such an animal could be bred from and would produce kids, and it was with the idea of investigating this possibility that he came for advice.



Abnormal male goat. Arrangement of genitalia: T—testes; E—epididymis; V.D.—vas deferens; C—uterine cornua; V—seminal vesicle; P—prostate; VAG.—vagina; M.U.—urinary meatus; P—penis.

Diagnosis.—The animal was seen in conjunction with Capt. E. C. Winter, F.R.C.V.S., of Worthing, and examination of the vagina revealed the presence of a large and functional clitoris. In view of this the owner's hopes of breeding from the animal were dashed to the ground, but as the case was considered one which might be of interest to students, the animal was transported alive to the Royal Veterinary College, where it was ultimately destroyed.

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Post-mortem Examination.—This revealed that the goat was undoubtedly a male, and thanks are due to Professor Wright, of the College, for performing the autopsy and for the accompanying diagram illustrating the arrangement of the genitalia.

A Case of Fractured Axis.

By Miss B. M. MURRAY, M.R.C.V.S.
AND
Miss L. R. ROBINSON, M.R.C.V.S.

Subject.—Borzoi bitch, four years old.

History.—The accident happened on February 23rd, 1936. The bitch was coursing and going very fast, when dropping her head to pick up a rabbit, she crashed head on into a tree stump which was about one foot high and eighteen inches across. She turned completely over and landed on her back on top of the tree stump, with all four legs stuck straight up into the air. She remained absolutely rigid in this position until picked up and laid on her side. She was unconscious. For about five minutes she did not breathe normally, but behaved like a dog which had been give H.C.N. After about twenty minutes she was breathing normally and had partially regained consciousness. When picked up her hind legs were seen to be useless, but there was evidence of some power in the fore legs.

She was carried for nearly two miles over rough country with as little jolting as possible. At the end of an hour she was perfectly conscious and ate a little chicken and drank some milk. Eight hours later she was motored home, lying on a mattress, a distance of about fifty miles. The only apparent injuries were a small abrasion over the left eye and bleeding gums.

February 24th.—General condition quite bright; appetite good. She evidenced no pain on palpation. Reflexes were slow, being slowest on right side, She had free use of her head and neck, but the only movement in her legs was one of continued stretching.

February 25th.—Not quite so bright. Appetite fair; temperature 100° F. Diarrhœa and sickness, owing, it was thought, to having eaten a leather collar.

February 26th.—Diarrhœa still persisting. An X-ray taken. The latter revealed a fracture of the axis. The line of fracture passed through the post-articular processes and involved a transverse process.

February 27th.—Given morphine sulph, gr. 2, and neck put in cellona bandage, reinforced with plaster of Paris. Diarrhœa ceased

February 29th.—Temperature rose to 105° F.; inappetance. Put on pot. iod., gr. viii, b.i.d.

March 3rd.—Started to lap eggs and milk. Tr: nux vom., m. v, was added to the pot. iod.

March 7th.—General condition very dull. Given an injection of 5 c.c. of Tonophosan. This was repeated at three-day intervals.

March 12th.—Plaster collar was removed as, due to the rapid loss of condition caused by the pyrexia, which had been a constant feature, it no longer fitted the neck.

March 14th.—Much brighter. Appetite improved, but variable. She was given roughly six eggs a day and one pint of milk, and occasionally as much as half pound of meat. Very often the latter had to be fed forcibly. About this time she seemed to gain more control over her sphincters. She also developed large patches of purpule discoloration on her skin, not necessarily on pressure points. An obstinate bed sore developed on the right hip.

From about March 12th onwards the reflexes almost imperceptibly improved, and also her ability to balance. On about March 24th her position became more normal, the legs not being kept so rigidly straight out. About this time she first attempted to squat while micturating, and a slight impulse to rise could be felt on completion.

March 29th.— Temperature 104.5° F. Swelling over one eye and on one nostril (same side). They were hot and painful. There was an œdematous swelling in one front paw. The paw remained œdematous for four or five days and was treated with cold applications. Later a large area of skin became discoloured and as thin as paper. On pressure being applied it burst and a small quantity of blood issued. It healed without further treatment. The swellings on the head were treated with hot fomentations and subsided after three or four days.

About March 20th it was noticed that when she was put on her feet she kicked out quite strongly with her hind legs. About this time Professor McCunn examined her and tested her reflexes. They were pretty fair all round, the weakest being in the left foreleg. He suggested putting her as much as possible in the standing position, in slings if possible. These were improvised with the aid of two broomsticks, two chairs, and a band of calico, and two soft stockings. They proved of no use, for the bitch just lay on them. If left alone she would throw her weight backwards and capsize the whole structure. From about the middle of March she had been lifted up twice daily and supported in the standing position for about five to ten minutes at a time.

From this point onwards I am afraid that I have not kept all the facts entered up. About the middle of April she had another severe setback. She ran a very high temperature for about a week, went entirely off all food, and only drank a little milk. She was thoroughly dejected and miserable. There was a great deal of nasal discharge, so severe at times that she had to breathe through her mouth, and her nose had to be continually cleared with cotton wool on forceps. This was the only time throughout her illness that she lost all interest in her surroundings. The only different treatment she had previous to this was three irradiations from an infra-red lamp. Whether this could have caused the set back I do not know.

From this time progress went steadily forwards. By the beginning of June

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she could stand for a few seconds unsupported, and by the middle of June she managed to stand for fifteen minutes. At this time she needed quite a lot of arranging before she could attain her balance, but if you moved her front quarters she could follow up pretty well with her hind legs, although she was inclined to keep her feet flexed. About the first week in July she first attempted to move her front legs in an effort to walk.

The ordinary routine of her treatment was fairly simple. She slept at night on a special mattress. During the day she slept on a divan from which she occasionally wriggled off and landed on the floor. She was arranged with pads so that none of her bony prominences, *i.e.*, shoulders, hips, etc., bore any weight. She was very prone to bed sores. She laid on one side during the day and on the other at night. On one occasion she spent thirty-six hours on one side when one obstinate bed-sore was bad. She was taken out twice daily, and sometimes three times, and for the greater part of the time she was pretty clean. Her bowels acted regularly twice a day without any laxative, except when she had her occasional bouts of diarrhœa.

Except during the two periods of hyperexia her diet consisted of a nightly feed of houndmeal or biscuit and meat. She drank very little, occasionally only once in forty-eight hours. For part of the time she was given 1 oz. daily of blood fibrinogen, but as this apparently caused diarrhœa it was stopped.

The bitch was destroyed on September 9th, as her progress seemed to have stopped. By this time she could move all her legs powerfully. When standing up she could be induced to take a step forward with all her legs if stimulated with a pin. She would make no attempt on her own, except when she was about two feet from her bed, when she endeavoured to get on to it. If one foreleg was placed on the divan she could almost put the second leg on and could give quite a powerful kick behind to get her hind legs up. She was destroyed mainly because she appeared to have no further interest in walking. When trying to make her walk she sulked, and as soon as she was laid down she was as gay as a lark. To arouse her interest she was taken out in the car and held up in it for drives, and was also taken into the garden and laid on the grass. Before she was destroyed she was examined by Professor McCunn, who found all reflexes normal. An X-ray taken at this time revealed that the fracture had apparently completely healed.

A post-mortem was performed by Mr. E. G. White, of the Royal Veterinary College. The only abnormality found was in the supraspinous process, the post-articular processes, and in the adjacent part of the arch. The line of fracture was completely healed. There was no displacement. On the ventral aspect of the arch and between the posterior articular processes there was evidence of recent ostitis. This area was very rough and showed numerous osteophytes. The right articular facet was almost completely covered by new bone. The meninges and spinal cord appeared to be normal. There was no pressure effects.

Summary and Conclusions.

The case is, we think, worthy of record in that it records the complete anatomical recovery of a lesion which generally has fatal results. It is rather puzzling to explain why, in view of the post-mortem findings, recovery was not complete functionally. We are inclined to think that the failure to make further progress was probably due to psychological reasons. It may be that if our patence had enabled us to persist for a while longer a complete recovery may have occurred.

Foreign Body in the Intestine of a Kitten.

By MARY L. SOMERVAIL, M.R.C.V.S.

Worthing.

Subject.—Male semi-Persian kitten, aged ten weeks.

History.—The kitten was brought to the morning surgery with the following history: The previous evening it had been playing in the garden with the dog, when suddenly the owner observed it lying on the ground quite motionless. She thought that the dog must have injured the kitten in some way, and that it was suffering from concussion. It regained consciousness in about five minutes, but appeared to be blind, and walked round the room knocking against the furniture. It had three further lapses into unconsciousness before it was brought for treatment. The kitten was weak, but did not resent examination, and was apparently blind to all the usual tests; it had a temperature of 100.4° F., the pulse was rapid and rather difficult to take. The visible mucous membranes were pale and the abdomen appeared slightly tympanitic. A moment or two after examination the kitten again collapsed and expired.

Post-mortem Examination.—This revealed the presence in the small intestine of a large fish's eye, about half an inch in diameter, which completely occluded the bowel, together with the usual phenomena encountered in intestinal obstruction.

Remarks.—This case is considered of interest on account of the rather unusual cause of the obstruction, and also because of the incidence of blindness.

Rupture of the Spleen in a Cat.

By MARY L. SOMERVAIL, M.R.C.V.S.

Worthing.

Subject.—A two-year-old neutered male cat.

History.—The cat was of a particularly nervous disposition, and never ventured out of the second-floor flat in which its owner lived. The slightest noise out of the usual, or the advent of a stranger into the house, was sufficient to make the animal spring on to the top of a bookcase, some five feet from the ground.

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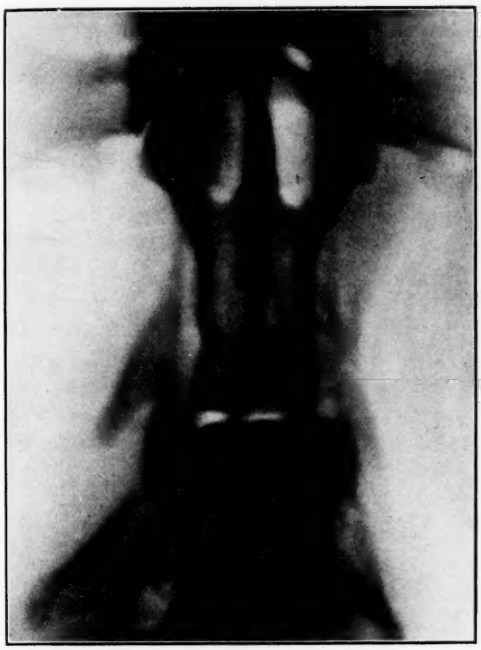
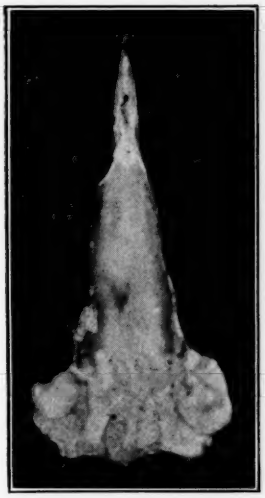
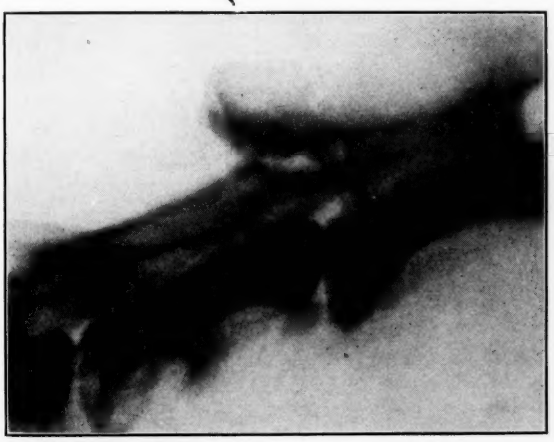


Dorso-ventral view, showing fracture of transverse process.



Ventral aspect of spine and posterior articular processes, showing area involved in ostitic changes.



Lateral view, showing line of fracture.

Dorsal aspect of spine and posterior articular processes.
The line of fracture is indicated by the dotted line.

(*Article by* Miss B. M. Murray, M.R.C.V.S., and Miss L. R. Robinson, M.R.C.V.S., *page* 61)

On the day in question the cat was disturbed by a car backfiring in the street, and made for its usual retreat, missed the jump and fell to the ground, but succeeded at the second attempt. About fifteen to twenty minutes later it sat up, swayed from side to side and fell from the bookcase to the floor. When the owner reached it, it was dead. Professional advice was sought as to the cause of death.

Post-mortem Examination.—This revealed a transverse rupture of the spleen, almost completely dividing it in two, and no other organ showed any abnormality which might have caused death.

Remarks.—The owner was positive that the cat had not met with a blow or accident of any kind, and that until the day of its death it had been a particularly healthy animal, although always very nervous. He did not think that there was any possibility of the cat having injured itself during his absence, as for the last two or three days he himself had been confined to the house. Assuming these facts to be correct, it would appear that the rupture must have occurred at the time of the unsuccessful jump to the bookcase, which, considering the litheness of the average cat and the easy manner in which it lands unharmed from much higher falls, makes the case rather unusual.

Abstracts of Current Literature

Recommendations of the Special Committee on Meat Hygiene. *Journal of the American Veterinary Medical Association.*

A COMMITTEE meeting held at the last American Veterinary Congress, of which Dr. J. S. Koen, Chicago, was Chairman, made the following recommendations on meat hygiene: "An uncompleted survey of abattoirs operating without meat inspection has revealed already more than 1,500 such establishments. At the most, not more than two-thirds of the animals slaughtered for meat in the United States are slaughtered at plants having Federal inspection; yet at these, 300,000 carcases are condemned annually for disease or other conditions rendering them unfit for food. It follows that an excess of 150,000 similar carcases must reach the uninspected plants and enter the channels of the retail trade; in fact a greater number than this, since the cold fact is that the tendency of a strict inspection is to cause diseased animals to be sent to slaughter-houses having no inspection. This obviously enhances the menace from uninspected meats. An uninspected supply of meat in the channels of trade is a potential liability in the nation's business. On the premise that meat inspection is clearly within the scope of veterinary science, the elimination of this liability is a debt which the veterinary profession owes to society—a debt which this association might well consider underwriting."

The Committee has compiled a list of 400 towns and cities in which slaughter-houses operate under local inspection. It is believed that the inspectors in many such cities need advice and instruction, and that the N.V.M.A. should furnish competent advice and instruction to such as request it. The Committee found that aside from those animals slaughtered under state supervision in California, and a small percentage that comes under efficient municipal inspection in various cities, there are more than thirty million animals slaughtered annually without inspection of any kind. " Any system of meat inspection that is inaugurated to supplement Federal inspection should be as nearly like the Federal system as local conditions will permit. Uniformity of inspection systems is essential if they are to be efficient. There is a greater possibility for uniform inspection under State supervision than can be secured by a multiplicity of ordinances by the many cities within a State. Further co-operation between State systems and the Federal system can be secured more readily under a State system than under city inspection. City inspection should be encouraged to become more efficient, but the best method to attain uniform and efficient meat inspection as a supplement to Federal inspection is by the adoption of State systems of supervision. Several million animals are slaughtered annually by owners on their own premises, both for sale and for their own consumption. There are thousands of butchers in small country towns who sell ' home-killed ' meats. Country or district abattoirs to which these animals could be brought for slaughter under State supervision would meet these conditions in a practical manner."

Motion Pictures of Interior of Bovine Rumen.

AMONGST interesting exhibits shown at the last meeting of the American Veterinary Congress were motion pictures showing the interior of the bovine stomach in normal activity, by Dr. A. F. Schalk, of Ohio State University. The film represented an eighteen months' co-operative project of Ohio State University and the Ohio Agricultural Experiment Station; the pictures showed in detail the muscular action and the movement of food in two of the four cavities making up the bovine stomach—the rumen and the reticulum. The rumen includes 80 per cent. of the space within the stomach. The motion pictures were taken by Professor Francis W. Davis, Chairman of the University's photographic department. For the purpose of the photography, as well as for an accompanying study of animal nutrition, a gastric fistula or opening was made on the left side of the animal, through the skin, abdominal wall, and into the rumen just beyond.

Five feeder steers, ranging from short yearlings to adults weighing as much as 1,300 pounds, were subjects for the research. According to Dr. Schalk, the animals showed no discomfort, carried on normal functions, and went to market in good condition at the close of the tests. Openings were kept closed with specially-designed plugs when not in use. Through special equipment, worked out by Professor Davis, interiors of the stomach cavities were illuminated by photo-flood light. Photography was carried on under difficulties. Body heat fogged

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the camera lens frequently. Muscular movements constantly changed the focus. But the finished film, partly in colour, clearly showed the movement of food and muscles in the animal's stomach. Waves of semi-liquid foods could be seen rushing through the stomach in the manner of ocean waves.

The present showing is described as preliminary by Dr. Schalk. The project is not yet completed, and additional movies are being taken. In the film, food and water are seen entering the stomach from the œsophagus, forages and whole grains coming in in the form of boli-masses heavily coated with saliva and mucus. At other times, when the animal is not feeding, saliva is seen to enter the stomach in periodic spurts of a few cubic centimetres each. Digestion is shown to be a constant process in this section of the stomach, and as the food is washed back and forth, boli are seen to break up as they come in contact with the muscular columns. When the material has been reduced to the proper consistency it passed to other sections of the stomach.

Photography was only one phase of the investigation, however. Accompanying it has been a close observation to show what is happening to the food from the physical and chemical standpoint. Samples were taken from the stomach contents for this purpose. The completed study will eliminate much guesswork in feeding, with consequent benefit to livestock growers and feed manufacturers. Problems involved in the study have held Dr. Schalk's attention for a long period. One of the first reports of his work in this field was heard at the previous convention of the national association at Columbus in 1920.

Occurrence of Diseases in Poultry. By SVEN WALL, *Skandinavisk I. Schrft.*, 1936.

Summary.

THE author gives an account of 4,419 sections of poultry performed at the State Veterinary Bacteriological Institute from January 1st, 1935, to June 30th, 1935. The following diseases were observed, *viz.*: Hereditary diseases (leucosis, 400 cases, or 9 per cent.), and tumours (132 cases, or 3 per cent., of which 65 cases were carcinoma), together, 532 cases, or 12 per cent. Infectious diseases in 1,494 cases, or 34 per cent. Parasitic diseases in 1,146 cases, or 26 per cent. Chemical diseases: poisoning (685 cases, or 15.5 per cent.), and deficiency diseases (377 cases, or 8.5 per cent.), together, 1,062 cases, or 24 per cent. Mechanically-produced diseases, caused by sharp, dead, foreign bodies, or by jars, blows, squeezing, bites or falls, together, 44 cases, or 1 per cent. Diseases with distinct anatomic morbid alterations which cannot be classified in any of the foregoing groups: 42 cases, or 0.97 per cent. Diseases without any distinct morbid alterations, which cannot be considered as falling within the above groups of diseases, together, 99 cases, or 2.25 per cent.

The diseases of poultry causing the greatest losses are as follows: The most likely hereditary disease, leucosis, which occurs in 9 per cent. of the cases examined.

The following infectious diseases: Pullorum disease in 13 per cent.; inflammation of the oviduct in 10 per cent.; tuberculosis in 4 per cent.; the parasitic disease coccidiosis which occurred in 19 per cent. Poisoning with inflammation of the intestine which occurred in 13 per cent., and the deficiency disease, gout, which occurred in 6 per cent. of the cases. Together, these diseases account for 74 per cent. of the diseases which have come under observation. Of these, pullorum disease and coccidiosis mainly affect the animals during the chicken stage, whereas leucosis, tuberculosis, oviduct inflammation and gout chiefly occur in mature fowl. Poisoning with inflammation of the intestine occurred with equal frequency in chickens and hens. Diseases belonging to the last three categories (mechanically produced, and diseases with and without distinct anatomic morbid alterations not belonging to any of the first five groups) indicate negligence in the care of the animals.

The object of the paper is to give practical advice to poultry breeders and keepers, as well as to practising veterinary surgeons and poultry experts. The account further proves that there are still large fields to be investigated and dealt with by both bacteriologists and parasitologists, as well as chemists; in particular by the chemists. It finally shows the need of a live experimental pathology in order to teach us to interpret the morbid alterations and their connection with the causes of the diseases in question.

A disease is not known until we know what causes it and the connection between the cause and the morbid alterations which are characteristic of the disease, as well as the connection between the causes of the disease and its course.

The grouping of the diseases as presented here is not intended to be final. The aim is to lay down the groundwork for a completely carried out causal grouping. For this reason the last group of diseases should in time be superseded by a group of thermal, electrical, photogenetical and allergic diseases. The efforts should be directed towards obtaining distinct diagnoses of the causes, giving the exact species of infection, of bacilli and parasites, as well as the species of the poison and the species of the deficiency disease which occur. It should also be attempted to obtain clear pathological-anatomical diagnoses of the nature of the morbid alterations, the degree and extension, in order to discover the cause with the aid of these changes. It is assumed, of course, that a firm connection can be established between the cause of the disease and the observed morbid alterations.

The Hotis Test for Mastitis. *Veterinary Medicine*, Vol. xxvii, No. 1.

A NEW test which promises to be a useful means of detecting mastitis, a troublesome and costly disease of dairy cattle, has been developed by research workers in the U.S. Department of Agriculture. The new method is known as the "Hotis test," named after its originator, R. P. Hotis, of the Bureau of Dairy Industry, who died soon after conducting most of the experimental work.

Although the method has been applied only on a limited basis thus far, depart-

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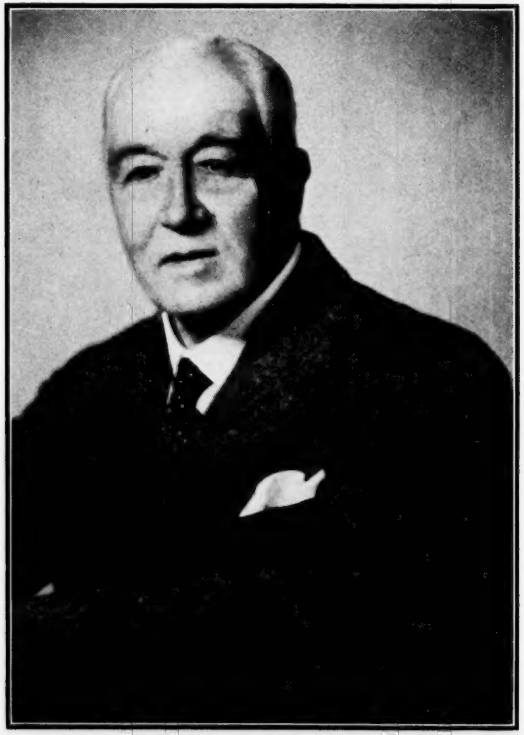
The late Miss Aleen Isobel Cust, M.R.C.V.S.
The pioneer to gain the Diploma of the Royal College of Veterinary Surgeons for women.



The late Major Henry Gurney Lepper, J.P., M.R.C.V.S.
Deputy Lieutenant for the County of Buckinghamshire.

ment officials plan to give it practical field tests to determine its adaptability under various conditions, for the diagnosis of mastitis in dairy herds.

Briefly the test consists in adding 0.5 c.c. of a sterile 0.5 per cent. aqueous solution of brom-cresol-purple (dibromorthocresolsulphonaphthalein) to 9.5 c.c. of milk previously measured into a sterile test tube. The tube is inverted several times to mix the contents and is then incubated for twenty-four hours at 37.5° C. When the dye and milk are first mixed, the mixture is a purple colour. If streptococci are present, the colour changes during the incubation period from purple to a greenish or yellow shade as the result of acid production from the lactose. Furthermore, if *Streptococcus agalactiæ* is present, small flakes or balls of growth, from 0.5 to 4 mm. in diameter, usually form on the side of the tube. These growths are usually canary-yellow and are quite distinctive. In a series of 753 samples the reactions by this test were in agreement with the blood-agar method in 94.6 per cent. of the samples.

Reviews

Practical Animal Husbandry. By WILLIAM C. MILLER, M.R.C.V.S., F.R.S.E., and Major E. D. S. ROBERTSON, M.R.C.V.S. Second edition, revised and enlarged. Edinburgh: Oliver & Boyd. Price 15*s*.

THIS book is an essential book in that it covers the most important points in animal husbandry, bringing together the various aspects which have been treated singly in the past. This work is written in a direct matter-of-fact way, and after reading it there should be very little that the reader does not know, in theory at least, about this subject. It is very well illustrated, the illustrations being of a very practical character, showing exactly the points the authors wish to bring out. The drawings are simple and do not confuse, while the photographs are of a very high standard, and give an idea of exactly the work involved. The title, "Practical Animal Husbandry," gives a clue to the contents; but besides this, the authors have included explanatory lists of names, breeds, etc., and diagrams which are very helpful, especially with regard to those terms which are not generally known, or which apply only to certain areas. There is a Foreword by Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S., in which he congratulates the authors on the book, and says: "It will serve a useful purpose as a text-book for our veterinary colleges, fitting in well with the new schedule of study in animal husbandry." These words are a tribute to "Practical Animal Husbandry," a book written on fact and experience, and on which the publishers are to be congratulated for the high quality of their production.

Obituary

MAJOR HENRY GURNEY LEPPER, J.P., M.R.C.V.S.

BY the death of Major Henry Gurney Lepper the profession has lost one of its "grand old men," and a very large circle of people of all classes will miss a very warm-hearted and true friend. Coming of a veterinary family, the name of Lepper has been

associated with the sporting and agricultural world of Buckinghamshire for over 100 years. He himself was eighty-six, and his diploma was taken at the London College in 1870. He spent the whole of his years in his native town and country, joining his father in practice immediately after qualifying. A true sportsman and judge of a horse, he gave freely of his services as judge or veterinary consultant to shows and gatherings of every kind where pedigree stock were to be found, and the practice which he carried on in partnership with his brother was amongst the largest and best in Great Britain. His popularity was manifested by the varied appointments which he was asked to fill, but the culminating point was reached when he was made Deputy-Lieutenant of the County in 1928. Although debarred by age from active service abroad during the late war, he had served a long period in the Royal Buckinghamshire Hussars, which he joined in 1878, and from which he retired as Veterinary Major in 1901. He was for many years a member of the Magistrates' Bench; and in politics, as an ardent Conservative, he frequently figured on the platform at the Aylesbury Town Hall meetings.

In our own profession it is not untrue to say that there was no man whose name was more esteemed than " Harry " Lepper; and his vitality, even during his later years, was such that he carried on his practice and still rode to hounds on every possible opportunity.

MISS ALEEN ISOBEL CUST, M.R.C.V.S.

The first woman to gain the Diploma of the Royal College of Veterinary Surgeons.

THE news of the death of Miss Aleen Cust, which took place at Kingston, in Jamaica, where she had gone partly to escape the changeable climate of the English winter and partly on a mission to help the animals in the West Indies, will be received with sorrow by every member of the veterinary profession. To the public her name will always go down as the pioneer of the entry of her sex into veterinary science, and as the first woman graduate to be awarded the Diploma of Membership of the Royal College of Veterinary Surgeons.

The eldest daughter of the late Sir Leopold Cust, Bart., and the sister of the late Captain Sir Charles Cust, R.N., Equerry to King George V, Miss Cust came of a distinguished family, but her relatives viewed with so much disapproval her wish to become a veterinary surgeon, that she was left to her own devices to overcome the difficulties which must of necessity beset the path of all pioneers; and it was only by her indomitable will that she eventually succeeded in her object. It was just after 1900 that Miss Cust entered as a student in the new Veterinary College at Edinburgh, gaining numerous prize medals of the first year, and the goodwill of the teachers and students alike, but when her name was presented as desirous of sitting for the first professional examination it was refused on the grounds that the word " student " implied " male student." The cudgels were strongly but unsuccessfully taken up on Miss Cust's behalf in the Council Chamber by Principal Williams, and at the same time the legal aspect was presented in the Scottish Law Courts, but Miss Cust was nonsuited on the ground of not being domiciled in Scotland.

However, not to be discouraged, she decided to continue through the whole of the four years' curriculum, gaining numerous distinctions and gaining practical knowledge by pupilage in country practice during the college vacations. At the end of her period of study Professor Williams awarded her a certificate to say that she had attended the necessary period of study, but, of course, this was not the coveted Diploma which Miss Cust desired; and it is a tribute to her perseverance and tenacity of purpose that she never gave up the chase after this elusive piece of parchment, until in December 1922, it became hers by right of examination.

During the interval her life had been a busy one for she had acted as assistant in

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Scotland and in Ireland, taking over, on the death of the late Mr. W. Burn, F.R.C.V.S., of Roscommon, one of the largest and widest-reaching practices in the county of Galway, her duties including an inspectorship and attendance at three dispensaries. Had it been in England this would have been against the law, but in the " Emerald Isle " the well-known chivalry of the Irish gentleman displayed itself in the sympathetic attitude which the Irish practitioners adopted towards Miss Cust, for she was popular with everybody and always " played the game." They even unanimously agreed to stand aside, refusing to apply for the veterinary inspectorship of the district in which she lived, in order that the district councillors might be able truthfully to say that they had no option but to appoint her as their Inspector of Animal Diseases, being the only applicant. And she did her job well. Many tales might be told of her popularity with the peasants and her skill, not only with horses and cattle, but with all classes of animal patients. She was usually described as " the woman with the lucky hands," and her veterinary judgment was on many occasions accepted without dispute by litigants on both sides. A bold rider to hounds, an all-round sportswoman with rod and gun, and a breeder of sporting dogs, her name was known throughout the country, and in August, 1914, when the Great War broke out her services were requisitioned to aid in the purchase of remounts for the Army.

In 1915 she took her car and volunteered for service with the Y.M.C.A. in France, and in 1917 was transferred to a position in one of the bacteriological laboratories attached to a veterinary hospital. It was this War service and the connection with the R.A.V.C. which enabled the Council of the R.C.V.S. to consider favourably her application to sit for the practical examination only, as a special case, with the result that she gained the first Diploma as a woman graduate on December 20th, 1922.

Her pioneer work has been followed by some seventy women graduates, and there are at present an equal number under tuition in our Colleges.

Of late years, owing to failing health, she had settled down at Lyndhurst in Hampshire, on the borders of the New Forest, leading a country life and occupying her time in breeding forest ponies and spaniel dogs; having produced by selection a breed of " pocket " cockers, which, however, although perfect little specimens of the type, were not acceptable for show purposes as a special breed by the ruling body of the Kennel Club.

She was a remarkable woman and a veritable pioneer, and the women of the profession will never realise how much they owe to the path which she blazed out for them. Her presence will be missed at the meetings of the branches of the N.V.M.A., of which she was a very ardent supporter, for she was welcome everywhere.

Preparations and Appliances

Dr. J. COLLIS BROWNE'S CHLORODYNE.

OVER ninety years ago—a long time; but it does not seem so long since Dr. J. Collis Browne's Chlorodyne was first introduced to those whose children, grandchildren and great-grandchildren are to-day the steadfast users of this world-famous medicine. Dr. J. Collis Browne's Chlorodyne was invented in 1846 by John Collis Browne, M.D., during his service as an Army surgeon in India. Its unvarying success in the treatment of so many of the disorders which flesh is heir to has earned it a title which none can gainsay—" a medicine-chest in itself." World-wide experience has proved it to be the pre-eminent remedy for influenza, coughs, colds, catarrh, asthma and bronchitis. That it " acts like a charm " in diarrhœa, stomach chills and other bowel complaints is a claim which a ninety years' history has established as an axiom.

News

PRESENTATION OF PORTRAIT TO SIR FREDERICK HOBDAY.

Sir Frederick Hobday, the Principal and Dean of the Royal Veterinary College, was honoured at the Connaught Rooms on Thursday, February 18th, when he was presented with his portrait in oils, painted by Mr. John Hassall, R.I. His Grace the Duke of Portland, who was accompanied by the Duchess, made the presentation on behalf of a large number of subscribers, and a very large number of colleagues and friends was present. The idea of the portrait originated from Mrs. Scott Dunn, the wife of Captain Scott Dunn, of Hove, and a Committee was formed consisting of Captain Scott Dunn, Major Hamilton Kirk, together with Professors McCunn and Miller, of the Royal Veterinary College.

The proceedings were introduced by Captain Scott Dunn, and the various items on the agenda were in turn brought to the notice of the Chairman by Professor McCunn. The Duke of Portland, in his introductory address, spoke with considerable personal friendliness of the work which Sir Frederick Hobday had done during his lifetime on behalf of the sick animals, particularly in the realms of anæsthetics and surgery, and finally he emphasised the splendid way in which he had assisted in the organisation of the rejuvenation of the Royal Veterinary College, both in regard to its teaching and the Phœnix-like rise of its new buildings and the finances which are so necessary its upkeep.

Upon the withdrawal of the curtain the appearance of the portrait was greeted with prolonged cheering, and at the instigation of His Grace, Sir Frederick's name was accorded musical honours. Sir Frederick Hobday, expressing his gratitude for the gift, referred to the help he had received from Lady Hobday. A man's life, he said, was made by his wife, and his life had been no exception.

Her Grace also made a very pretty speech, at the end of which she was presented by Miss Scott Dunn with a beautiful bouquet of carnations fastened together with a ribbon of the Portland racing colours. Votes of thanks to the Duke and Duchess were proposed and seconded in appropriate terms by Professor McCunn and Major Hamilton Kirk, and in reply to a call for the artist, Mr. John Hassall made one of his characteristic humorous speeches, in which he expressed pleasure at the reception which was given to his work. Tea was afterwards partaken by the company present.

Personal

Students and Graduates of the London College will regret very much to hear of the death of Mr. Sidney Thomas Lethbridge, the Managing Director of Messrs. Spratts, Ltd. It was largely the encouragement and help which Mr. Lethbridge (aided by the indefatigable energy of Capt. Hobbs, the founder of the Tailwaggers' Club) gave to the successful appeal, which resulted in the donation of £20,000 to the Canine Department of the Royal Veterinary College. He was a man of the greatest charm, and the world is much the poorer by his loss.

His Royal Highness the Duke of Gloucester, K.G., has consented to become President of the British Empire Cancer Campaign.

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